3-tube Portable color camera

BVP-3A/30series

BVP-3A/3AP/3AS/3APM
BVP-30/30P/30S/30PM

Sony Broadcast

SONY

The BVP-3A/30 are a new generation of Broadcast Portable Color Cameras ideally suited for ENG/EFP applications.

The BVP-3A achieves outstanding performance in resolution, sensitivity, S/N ratio, lag, and color fidelity by optimizing the performance of the 3-tube system employing the newly developed MF system (magnetic focus, electrostatic deflection), Saticon™ tubes.

The BVP-30 provides superlative sensitivity by adopting Diode Gun Plumbicon™ tubes to meet the market requirements. With this newly developed 2/3-inch Diode Gun Plumbicon™ employing electrostatic deflection, the BVP-30 has the full range of features identical to those in the BVP-3A.

Additional useful features are the exceptionally compact, lightweight construction and lower power consumption. A rugged diecast magnesium alloy camera mainframe maintains precise electro-optical alignment under arduous physical conditions. A full range of setup and operational automatic facilities required for portable color camera operation are provided.

Designed as an integral element in the Betacam recording system, the BVP-3A/30 also have full capability and flexibility for independent operation as a new generation stand alone portable camera. Used with either the CA-3 or CA-30 camera adaptor, the BVP-3A/30 can provide both component/composite signal outputs to meet all the requirements of present and future systems.

When fitted with the CA-31 Triax Camera Adaptor, the BVP-3A/30 may be connected to a CCU-360 and operated as part of a BVP-360 multi camera system.

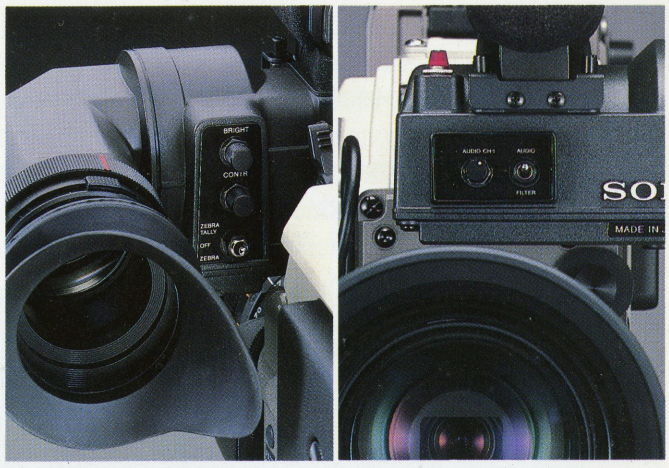
Automatic beam optimizer

The BVP-3A/30 accept excessive light inputs up to about 10 times normal conditions without comet tail or blooming effects. This ensures the best possible performance with dynamic changes in scene illumination.

Automatic tube protection shutter

To provide camera tube protection, the shutter closes automatically when:

- Camera is off
- CAMERA/VTR switch is in PREHEAT position
- Output switch is in BARS position
- Automatic black balance adjustment is being performed
- Camera test signal is being used



- Irregularity in servo
- Condensation
- Tape slack

Return video is also available in veiwfinder.

Viewfinder Indications

To assist the operator, the following viewfinder indications are available:

- REC status indicator (red)
- FILTER indicators: 1.2.3.4.
- GAIN indicator
- WHITE/BLACK balance confirmation
- AUTO CENTERING confirmation
- Tape remaining in Betacam Recorder BVV-1A
- Video level indicator
- Audio level indicator
- Battery alarm

The following warning indications are also provided to prevent misshooting.

- Tape nearing end
- Tape end
- Battery low
- Battery flat
- Error in recording system

Other Features

- **2-line image enhancement**
- **Memory back up capacitor**

The BVP-3A/30 have a back up capacitor for memory storage of adjusted values of set up and operational functions.

- **Built-in uni-directional microphone**
- **Shading compensation for lens extender**

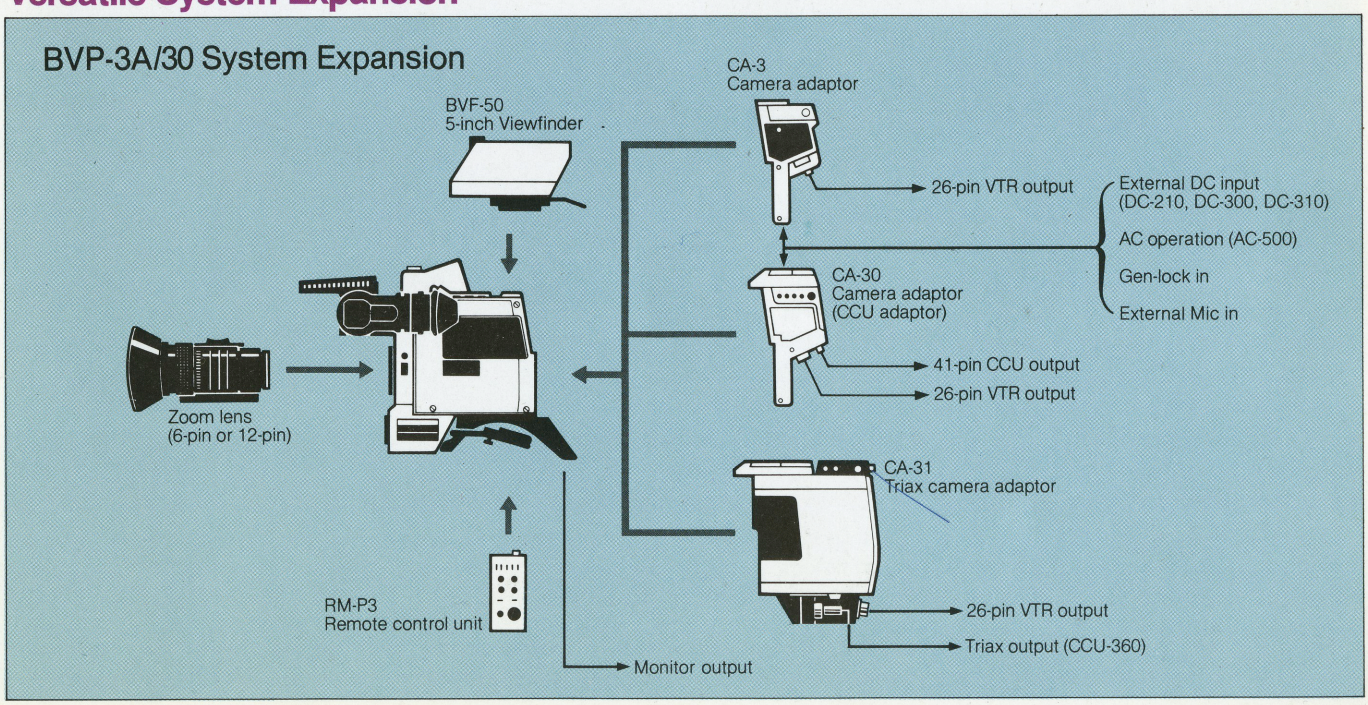
New shading compensator circuit is added to compensate shading when lens extender is used.

- **Automatic iris adjustment mechanism**

Continuously and rapidly corrects the lens opening to compensate for changes in scene illumination.

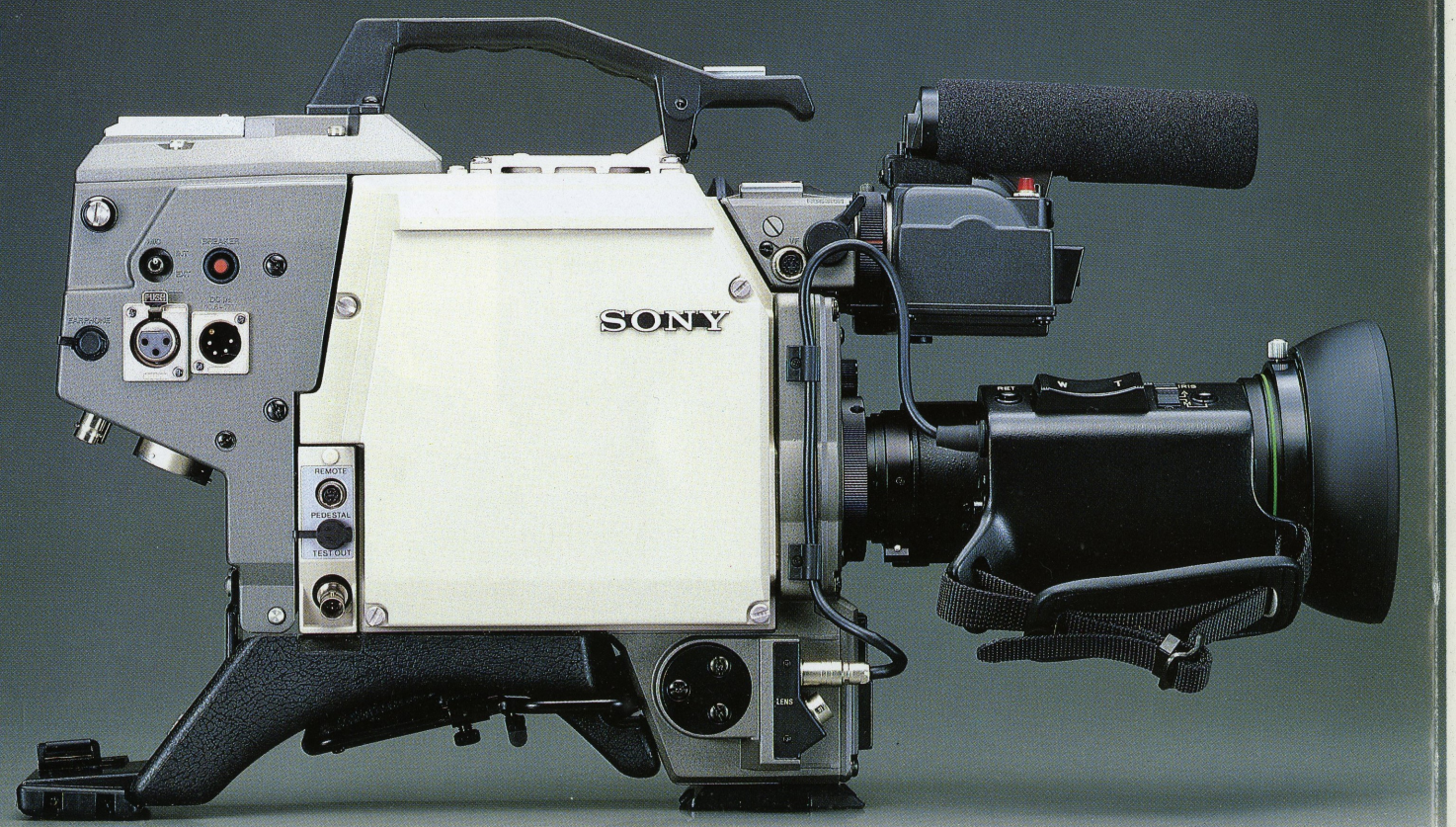
- **Masking circuit**
- **Level indication by zebra pattern**
- **Audio level control with BVV-1A Betacam recorder**

Versatile System Expansion



BVP-3A/3AP/3AS/3APM (NTSC) (PAL) (SECAM) (PAL-M)

BVP-30/ 30P /30S/30PM (NTSC) (PAL) (SECAM) (PAL-M)



* The lens and the CA-30 are optional.

Superior Picture Performance

High resolution

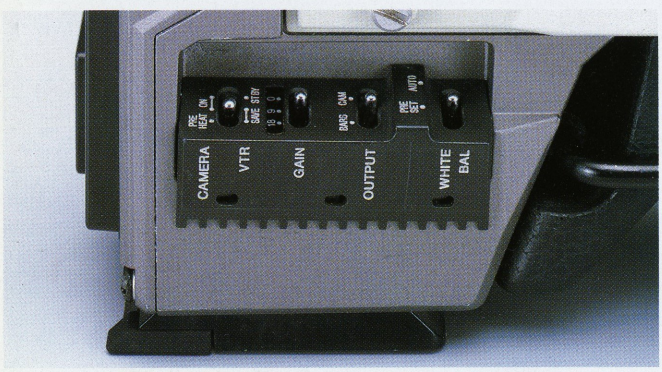
Due to the reduced beam spot size capacity of the MF "SATICON" tubes used in the BVP-3A, center resolution of 650 TV lines can be achieved, exceptionally high for a portable camera. Similarly, with the new PbO tubes used in the BVP-30, center resolution of 650 TV lines is a standard. Corner resolution is also improved in both cameras, since a constant beam focus can be maintained over the active area of the tube face.

High signal-to-noise ratio

An S/N ratio of 59dB (NTSC, PAL-M)/57dB (PAL, SECAM) is possible with BVP-3A/30 due to the low output capacitance of the target electrode, combined with a low noise FET with high sensitivity. Excellent circuit performance and an exclusive method of isolating the target electrode from deflection crosstalk make further contribution to improvement in S/N ratio.

High sensitivity

The PbO photoconductive layer used in the BVP-30 pickup tubes achieves superior sensitivity of 2000 lux at F4.5. Standard sensitivity of the BVP-3A is 2000 lux at F4.0. A three position gain switch is provided (0, +9, +18dB selectable). Operation in light levels as low as 30 lux (BVP-3A) or 25 lux (BVP-30) is possible at F1.4 and with the +18dB gain.
Color balance is maintained with change of gain.

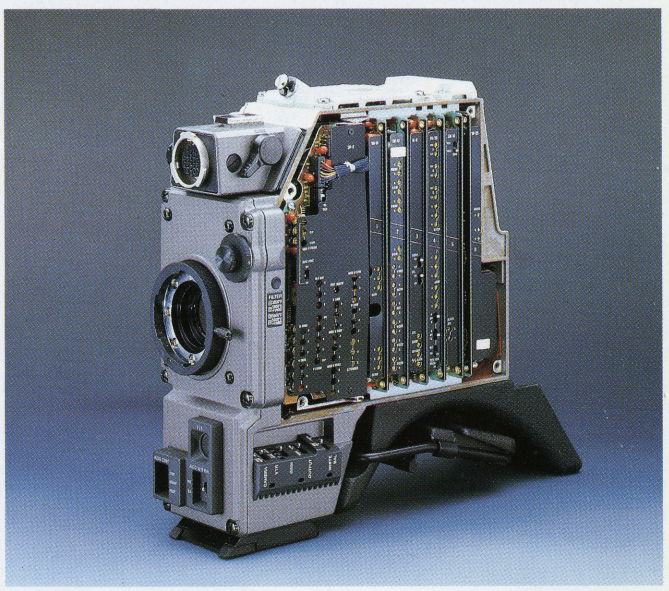


Less registration error

Improved deflection accuracy provides remarkably reduced registration error. This also contributes to improved luminance resolution in the corners.

Compact, Lightweight and Rugged Construction

The new camera tube technology has enabled Sony to realize an exceptionally compact and lightweight 3-tube color camera. Weighing only 4.3 kg (9 lb 8 oz) without lens, this readily fulfill the key criteria of second generation ENG/EFP equipment, that of film style mobility with improved picture performance. The magnesium diecast alloy frame assures rugged construction.



Automatic Functions

The BVP-3A/30 are furnished with a host of automatic operational features assuring the greatest ease in operation and simple adjustment.

Automatic centering

A newly developed circuit gives easy adjustment without the requirement of a special test chart. The digital memory stores reference data for about a week even if not powered during that period and the preset mode returns the camera to basic set up when repowered.

Automatic White/Black balance

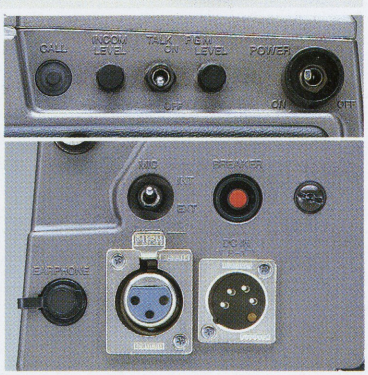
The BVP-3A/30 employ a digital white balance process with the added convenience of storing a value of white balance for each optical filter wheel position. This allows instant and automatic recall of a previous balance if the filter is switched to compensate for changes in lighting conditions. The automatic black set function of the BVP-3A/30 not only balances the black level under normal operating conditions but it utilizes the switching capability of the microprocessor to automatically balance the high gain setting as well.

Versatile System Expansion

CA-30 Camera Adaptor

When used with a CA-30 Camera Adaptor, the BVP-3A/30 can be connected to a CCU-300 Camera Control Unit.
The CA-30 is furnished with a 26-pin output for connection to portable VTRs, and a 41-pin output for connection to the CCU-300. The CA-30 also provides the BVP-3A/30 with gen-lock capability making multiple camera operation possible. The adaptor has a built-in shoe for mounting the BVF-50 viewfinder.

CA-30

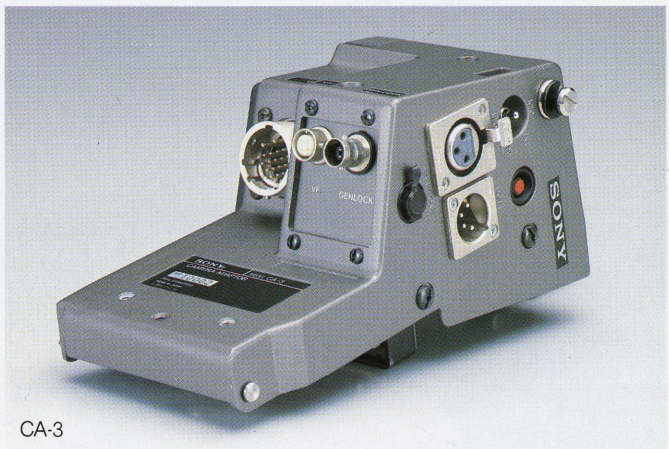


Connectors/switches

- Composite/component outputs for portable VTRs (26-pin):
  *for BVV-1A/VA-1 via CCZ (26—26-pin) cable
  *for BVU or BVH VTRs via CCZQ (26—14-pin) cable
- 41-pin output for CCU-300 Camera Control Unit:
  *max. 300m separation with CCW cable
  *DCU-300 Digital Command Unit can also be used with CCU-300
- Gen-lock input connector
- Program (PGM) connector
  *adjustable audio level
- Intercom system connector
  *adjustable audio level
- External DC input (XLR 4-pin connector)
- External Mic input (XLR 3-pin connector)
- Earphone jack
- Talk switch
- Call button

CA-3 Camera Adaptor

Using the CA-3 Camera Adaptor, the BVP-3A/30 can provide both component (R-Y, B-Y, Y) and composite signal outputs via a 26-pin cable to any recording VTR. Separate use of Betacam Recorder BVV-1A and BVP-3A/30 is therefore possible. In addition, all current U-matic or BVH series 1-inch C Format VTRs can be used with the BVP-3A/30 taking the composite signal output. The adaptor provides the BVP-3A/30 with gen-lock capability making multiple camera operation possible.



CA-3

CA-31 Triax Camera Adaptor

Using the CA-31 Triax Camera Adaptor, the BVP-3A/30 can be connected to a CCU-360 via triax cable. The transmission system is identical to that used between BVP-360 and CCU-360 (component, Y/R-Y/B-Y).
This permits the BVP-3A/30 to be used as a portable unit in multi camera system employing the BVP-360, Sony's new Studio/OB camera

CA-31

5-inch viewfinder, BVF-50

An optional 5-inch B/W viewfinder is available for EFP or studio use in addition to the standard 1.5-inch viewfinder furnished with the BVP-3A/30.

External DC input

An external DC supply is possible for the BVP-3A/30 with the CA-3/30 by any of the following five methods:

- via 26-pin connector from VTR
- DC-300 (Battery case for BP-90)
- DC-310 (Battery case for two NP-1)
- DC-210 (Belt type battery case for BP-90)
- AC-500 (AC adaptor for AC power operation)

External microphone input

Using an optional CA-3 or CA-30, an external microphone input is available in addition to the high quality built-in unidirectional microphone. (Internal/External switchable)

Two types of lens connector

- 6-pin connector: All current lenses used with BVP-300 series or DXC-6000 can be used.
- 12-pin connector: The additional pins provide the new facility of the shading compensation function when 2× extender is used.

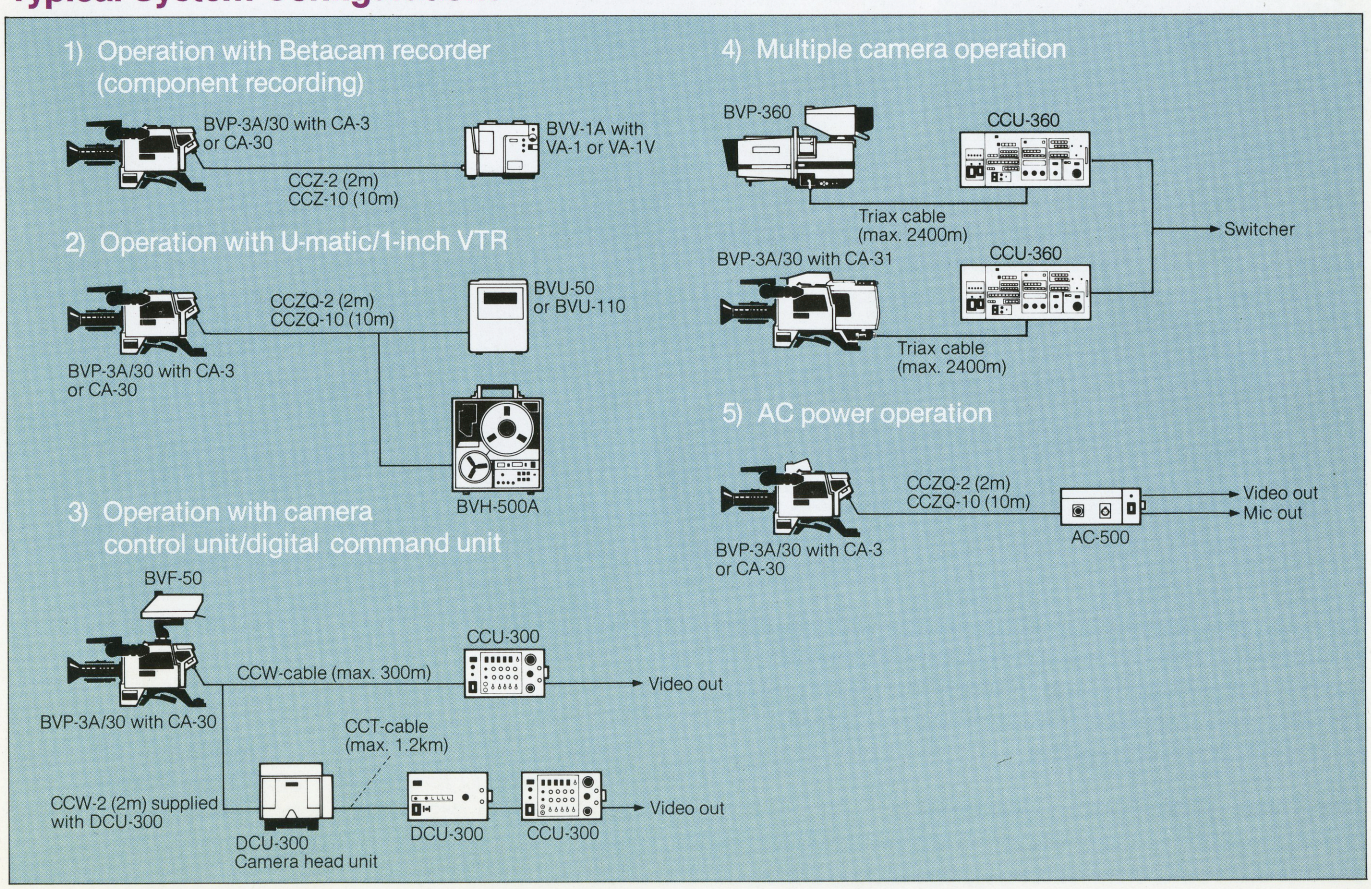
RM-P3, Simple Remote Camera Control

Remote operation of basic camera head controls such as R/B gain, iris, master pedestal, and fine color adjustment, etc., are available via a 6-pin cable. A 10m cable is supplied with RM-P3 unit. This adds another degree of production flexibility in providing the capability of real time adjustment whilst on location.

Controls

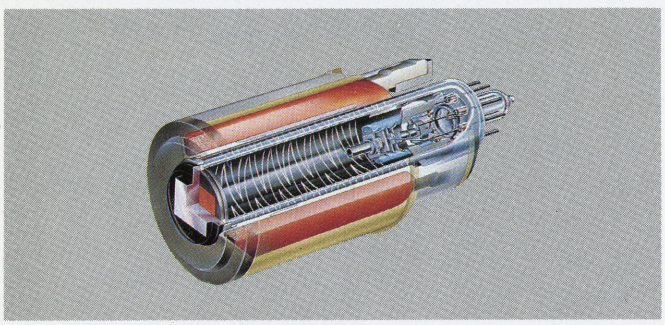
- R/B gain, Pedestal level control
- Iris control
- Master pedestal level control
- Output selection (Camera, Bars, Test)
- Gain switch (0, +9, +18dB)
- Auto centering
- Auto B/W balance
- Auto iris switch

Typical System Configurations



New Technology Electrostatic Deflection System in the BVP-3A

Consistent study and research by Sony on camera tubes employing MF systems has resulted in a new electrostatic deflection system. The CT-2322 MF "SATICON" is a product of this research and this is utilized for the first time in the BVP-3.



Electrostatic deflection

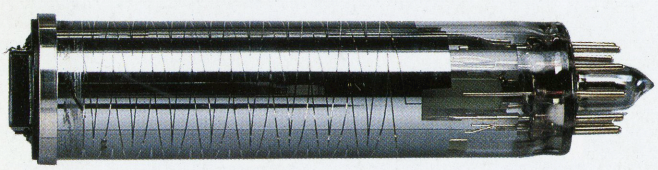
The CT-2322 is an innovative 2/3-inch tube which embraces all of the features of the new tube technology. It is approximately three quarters of the length of a standard Saticon™ yet has twice the geometric and registration accuracy of conventional 2/3-inch systems. Requiring no deflection coil assembly, highly controlled deflection of the electron beam is achieved by precision electrodes deposited directly on to the inner wall of the tube. The focusing coil is assembled around the tube. This results in a compact lightweight tube-yoke system. The totally new electron-optic system also provides superior corner resolution.

Diode gun construction

The new diode gun construction in the CT-2322 allows smaller and more precise beam landing spot size which contributes to the improved center resolution of 650 TV lines.

Short length of pick-up tube

The CT-2322 is about 20% shorter than conventional 2/3-inch Saticon™ or Plumbicon™ tubes and is almost the same length as current 1/2-inch tubes. This made possible a considerable reduction in the overall size of the BVP-3A, while avoiding the performance compromises of the 1/2-inch tubes.



Actual size

L.O.C. type output

The output terminal of the CT-2322 has a special pin arrangement providing a considerably reduced tube output capacitance, making possible a high S/N ratio. In addition, the pre-pre-amplifier FET is mounted on the faceplate and this makes a further improvement in S/N ratio possible.

Improved photoconductive layer

The improved Saticon™ layer has low lag and anti-sticking photoconductive properties reducing highlight sticking and lag.

Better stability

The high quality electrostatic deflection system ensures uniformity of the electron beam near the target. A high degree of stability in the total deflection system and hence better image stability is achieved in normal operation.

Low geometric distortion

Since there is no interaction between deflection and focusing fields, very low geometric distortion figures can be achieved.

New 2/3-inch Diode Gun Plumbicon™ tube employing electrostatic deflection in the BVP-30

To meet strong market demand, a newly developed PbO tube system is employed in the BVP-30.

Electrostatic deflection

For the first time ever in Diode Gun Plumbicon™ tubes, electrostatic deflection is used in the tubes fitted to the BVP-30. Improved electrode design and construction also permits drive voltages to be used with these tubes lower than those normally required with conventional Plumbicons™.

Improved corner resolution

Since this tube employs electrostatic beam deflection and magnetic beam focus, there is no interaction between the two fields. Hence, constant beam focus can be maintained over the active area of the tube face. This, combined with excellent raster linearity, makes a major contribution to improved corner resolution.

Short length of pick-up tube

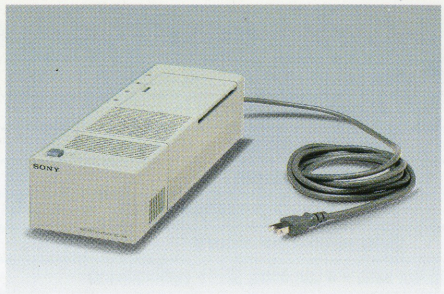
The short length of this tube, only 85mm, has made possible considerable reduction in the overall size of the BVP-30.

PbO photoconductive layer

This contributes to the superior sensitivity of 2000 lux at F4.5 of the BVP-30.

Optional Accessories

AC-500/500CE
AC adaptor



BC-1WA
Battery charger for NP-1 (up to four NP-1s)

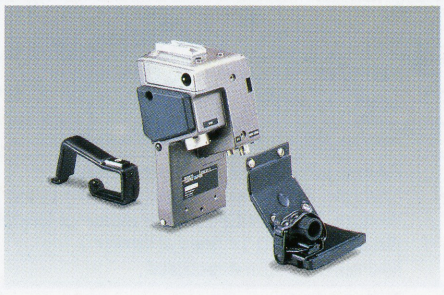
BC-210/210CE
Battery charger for BP-90 (up to four BP-90s)

BP-90
Ni-Cd rechargeable battery

NP-1
Ni-Cd rechargeable battery

BVF-50/50CE
5-inch B/W viewfinder

CA-30
Camera adaptor (CCU adaptor)



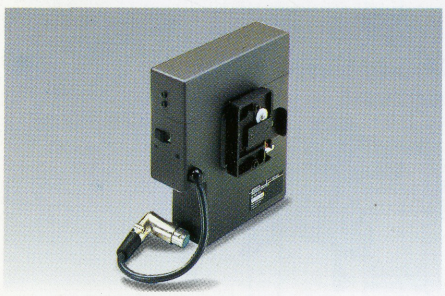
CA-3
Camera adaptor

CA-31
Triax camera adaptor

CCU-300/300P/300PM
Camera control unit

DCU-300/300P/300PM
Digital command unit

DC-210
Battery case for BP-90



DC-300
Battery case for BP-90

DC-310
Battery case for NP-1 (up to two NP-1s)

RM-P3
Camera remote control unit

Connecting cables

- CCZ cable (26-pin—26-pin) : CCZ-2 (2m), CCZ-10 (10m)
- CCZQ cable (26-pin—14-pin): CCZQ-2 (2m), CCZQ-10 (10m)
- CCW cable (41-pin—41-pin) : CCW-25 (25m), CCW-50 (50m), CCW-100 (100m)
- CCT cable (Triax) : CCT-50 (50m), CCT-100 (100m), CCT-150 (150m), CCT-300 (300m)

Specifications

	BVP-3A/3APM	BVP-3AP/3AS	BVP-30/30PM	BVP-30P/30S
Color system	NTSC/PAL-M	PAL/SECAM	NTSC/PAL-M	PAL/SECAM
Pick-up tube	2/3-inch MF "SATICON"		2/3-inch Diode Gun Plumbicon™	
System	RGB 3-tube system			
Optical system	F1.4 prism system			
Filter wheels	1:3200°K 2:5600°K + 1/4 ND 3:5600°K 4:5600°K + 1/16 ND			
Lens mount	Special bayonet mount			
Sensitivity	2000 lux with F4 (typical), 90% reflectance		2000 lux with F4.5 (typical), 90% reflectance	
Minimum subject illumination	Approx. 30 lux (F1.4 lens, +18dB)		Approx. 25 lux (F1.4 lens, +18dB)	
Signal-to-noise ratio	59dB (typical)	57dB (typical)	59dB (typical)	57dB (typical)
Horizontal resolution at center	650 TV lines	650 TV lines	650 TV lines	650 TV lines
Registration error zone 1	0.1% (within circle with a diameter corresponding 80% of picture height)			
zone 2	0.15% (within circle with a diameter corresponding to picture width)			
zone 3	0.3% (others)			
Geometric distortion	Less than 1% (all zone)			
Warm up time	3.5 seconds (from pre-heat condition)			
Video output	1.0Vp-p 75 ohms, sync negative (from Test out)			
Connectors	CAMERA ADAPTOR : 50-pin connector TEST OUT: BNC connector LENS: 6-pin and 12-pin REMOTE: 6-pin			
Power requirements	DC 12V (10.5V to 17V)			
Power consumption	20W	20W (22W, SECAM)	24W	24W (26W, SECAM, tentatively)
Operating temperature	−20°C to +40°C (−4°F to +104°F)			
Storage temperature	−20°C to +50°C (−4°F to +122°F)			
Weight	Approx. 4.3 kg (9 lb 8 oz) with viewfinder			
Viewfinder	Picture tube: 1.5-inch monochrome Controls: Brightness, Contrast, Audio Level Switch: Tally ON/OFF, Level Indicator ON/OFF Resolution: 500 TV lines at center Microphone: Uni-directional			
Supplied accessories	Tripod adaptor ×1 Tripod bracket ×1 Extension board ×1 Extractor ×1 Chart for auto centering adjustment ×1 Operation and maintenance manual ×1			

CA-30 specifications

Connectors:

MIC IN—XLR 3-pin 600 ohms, balanced
DC IN—XLR 4-pin 10.5V - 17V
GEN-LOCK IN—BNC, 1Vp-p, 75 ohms
Viewfinder—4-pin, power supply to the BVF-50
Earphone—Mini jack 8 ohms
VTR—26-pin (CCZ type)
CCU—41-pin (CCW type)
INCOM—Headset double jack
PGM—Headset double jack

Power consumption: 1.5W (connecting with BVP-3A/30)
Weight: Approx. 950 g (2 lb 2 oz)

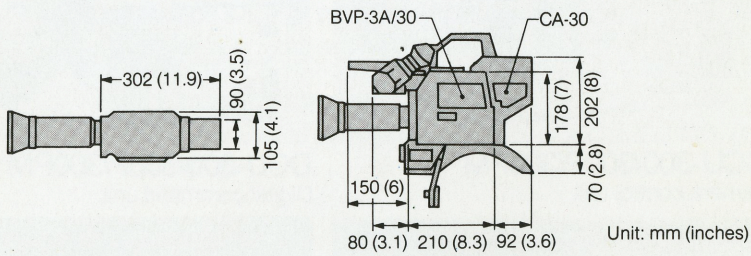
CA-3 specifications

Connectors:

MIC IN—XLR 3-pin 600 ohms, balanced
DC IN—XLR 4-pin 10.5V - 17V
GEN-LOCK IN—BNC, 1Vp-p, 75 ohms
Viewfinder—4-pin, power supply to the BVF-50
Earphone—Mini jack 8 ohms
VTR—26-pin (CCZ type)

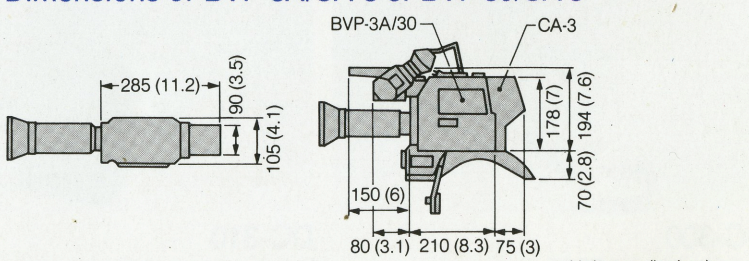
Power consumption: 0.85W (connecting with BVP-3A/30)
Weight: Approx. 550 g (1 lb 3 oz)

Dimensions of BVP-3A/CA-30 or BVP-30/CA-30



Unit: mm (inches)

Dimensions of BVP-3A/CA-3 or BVP-30/CA-3



Unit: mm (inches)

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